

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application. Applicant believes that the changes effected herein add no new matter.

**Listing of Claims:**

1. (Currently Amended) A method of transmitting data in a wireless MC-CDMA system to a set of M users comprising the steps of:

Providing providing a transmitter system with N sub-carriers divided into G groups. , N and G being integers;

determining the an instantaneous group SNR that is calculated using an effective channel function for each user in each group of sub-carriers. ; and

for each user and in each group of sub-carriers, using the instantaneous SNR of an equivalent single sub-carrier as a metric for resource allocation at the transmitter.

2.(Original) A method as in claim 1, further comprising:

receiving the data at the MC-CDMA receiver, and

demodulating the received data using a demodulator that corresponds to the resource allocated at the transmitter.

3. (Original) A method according to claim 1, in which said\_user data bits are modulated with a modulation scheme corresponding to said that user's group SNR and spread in frequency over said sub-carriers belonging to said that user's group.

4.(Currently Amended) A method according to claim 3, further comprising, for each user comparing the instantaneous group SNR of each group of sub-carriers with a pre-defined set of switching thresholds to determine the bit allocations for the equivalent sub-carrier, and modulating each equivalent sub-carrier with a corresponding number of data bits, corresponding to said the user's group SNR.

5.(Currently Amended) A method according to claim 3, for each user using the instantaneous group SNR of said the user's group of sub-carriers, calculating the bit and power allocation for each equivalent sub-carrier and modulating each equivalent sub-carrier with a corresponding number of data bits, corresponding to said the user's group SNR.

6.(Original) A method according to claim 1, further comprising the step of, for each user and in each group of sub-carriers, regarding the instantaneous group SNR as the instantaneous SNR of an equivalent single sub-carrier to the group.

7.(Currently Amended) A method according to claim 4, in which  
any groups of sub-carriers having a group SNR below a switching threshold are not modulated;  
at least one group of sub-carriers having a first group SNR above said switching threshold is modulated with a first number of data bits according to a first modulation scheme; and  
at least one group of sub-carriers of said G groups having a second group SNR next above said first group SNR is modulated with a second number of data bits according to a second modulation scheme; and  
~~the remaining members of said G groups of sub-carriers above thresholds separating group SNR regions are modulated with corresponding numbers of data bits according to corresponding modulation schemes.~~

8.(Original) A method according to claim 4, in which at least one switching threshold between at least two SNRs is chosen to satisfy a performance criterion of a system.

9.(Currently Amended) A method according to claim 71, in which user data bits for each user in each group of modulated sub-carriers are modulated by a modulation scheme corresponding to the user's group SNR, then spread with a spreading code associated with that user, and loaded into the sub-carriers of the user's group.

10.(Cancelled)

11.(Currently Amended) A method according to claim 109, further comprising a step of adding the chips from all users synchronously across all the sub-carriers in said G groups, on a sub-carrier-by-sub-carrier basis and then transmitting an OFDM symbol formed by the addition of said chips.

12.(Currently Amended) A method according to claim 3, further comprising a step of calculating for each user an effective channel function;

~~Calculating calculating~~ from said effective channel function a group SNR of the sub-carriers in said effective channel function; and

comparing the instantaneous group SNR of each group of sub-carriers with a pre-defined set of switching thresholds to determine the bit allocations for the equivalent sub-carrier, and modulating each equivalent sub-carrier with a corresponding number of data bits, corresponding to said group SNR.

13-18.(Cancelled)

19.(Currently Amended) A ~~wireless MC-CDMA system transmitter for wirelessly~~ transmitting data to a set of M users comprising:

~~a transmitter with N sub-carriers divided into G groups, said transmitter having a modulator for modulating said N sub-carriers that are divided into G groups, N and G being integers; -~~

~~circuitry for calculating Each of said G groups having an instantaneous group SNR calculated using an effective channel function for each user in each group of sub-carriers; and~~

~~Resource resource allocation means at said transmitter for allocating, using said instantaneous SNR of an equivalent single sub-carrier as a metric, at least one resource for each user and in each group of sub-carriers.~~

20.(Currently Amended) A ~~system transmitter~~ as in claim 19, further comprising:

at least one MC-CDMA receiver for receiving the data over resources allocated using an instantaneous SNR of an equivalent single sub-carrier as a metric; and  
a demodulator that corresponds to the resource allocated resources at the transmitter for demodulating the received data.

21.(Currently Amended) A system transmitter according to claim 19, in which said the modulator modulates data bits are modulated with a modulation scheme corresponding to said group SNR, and the transmitter further comprising a spreader for spreading the unmodulated data bits spread in frequency over said sub-carriers belonging to said group.

22.(Currently Amended) A system transmitter according to claim 21, further comprising means for comparing the instantaneous group SNR of each group of sub-carriers received by each user with a pre-defined set of switching thresholds to determine the bit allocations for the equivalent sub-carriers of said each user; and  
Modulation means for modulating the modulator operates to modulate each equivalent sub-carrier with a corresponding number of data bits, corresponding to said group SNR.

23.(Currently Amended) A system transmitter according to claim 21, further comprising means for calculating the wherein the circuitry for calculating further calculates bit and power allocation, for each user using the instantaneous group SNR of each group of sub-carriers, for each equivalent sub-carrier and modulating each equivalent sub-carrier with a corresponding number of data bits, corresponding to said group SNR.

24.(Currently Amended) A system transmitter according to claim 19, in which, wherein the circuitry for calculating further calculates, for each user and in each group of sub-carriers, said SNR is calculated by regarding said instantaneous group SNR as the instantaneous SNR of an equivalent single sub-carrier.

25.(Currently Amended) A system transmitter according to claim 22, in which the modulator does not modulate any groups of sub-carriers having a group SNR below a switching threshold ~~are not modulated~~;

the modulator modulates with a first number of data bits according to a first modulation scheme at least one group of sub-carriers having a first group SNR above said switching threshold ~~is modulated with a first number of data bits according to a first modulation scheme~~; and

the modulator modulates with a second number of data bits according to a second modulation scheme at least one group of sub-carriers of said G groups having a second group SNR next above said first group SNR ~~is modulated with a second number of data bits according to a second modulation scheme~~; and  
~~the remaining members of said G groups of sub-carriers above thresholds separating group SNR regions are modulated with corresponding numbers of data bits according to corresponding modulation schemes.~~

26.(Currently Amended) A system transmitter according to claim 22, in which the circuitry for calculating operates to select at least one switching threshold between at least two SNRs ~~is chosen so as to~~ satisfy a performance criterion of a system.

27-28.(Cancelled)

29.(Currently Amended) A system transmitter according to claim 2820, further comprising means for adding the chips from all users synchronously across all the sub-carriers in said G groups, on a sub-carrier-by-sub-carrier basis and then transmitting an OFDM symbol formed by the addition of said chips.

30.(Currently Amended) A system transmitter according to claim 19, further comprising means for calculating wherein the circuitry for calculating further calculates, for each user, said effective channel function and calculating therefrom said group SNR of the sub-carriers in said effective channel function.

31-40.(Cancelled)

41. (New) A transmitter according to claim 19 disposed in a mobile station.

42. (New) A transmitter according to claim 19 disposed in a base station of a cellular communication system.

43. (New) A program of machine-readable instructions, tangibly embodied on an information bearing medium and executable by a digital data processor, to perform actions directed toward transmitting data in a wireless multi-carrier spread spectrum communication system, the actions comprising:

providing a transmitter system with  $N$  sub-carriers divided into  $G$  groups,  $N$  and  $G$  being integers;

determining an instantaneous group SNR that is calculated using an effective channel function for each user in each group of sub-carriers; and

for each user and in each group of sub-carriers, using the instantaneous SNR of an equivalent single sub-carrier as a metric for resource allocation at the transmitter.

44.(New) A program of machine-readable instructions according to claim 43, wherein the actions further comprise:

receiving the data at the MC-CDMA receiver, and

demodulating the received data using a demodulator that corresponds to the resource allocated at the transmitter.

45. (New) A program of machine-readable instructions according to claim 43, in which user data bits are modulated with a modulation scheme corresponding to that user's group SNR and spread in frequency over said sub-carriers belonging to that user's group.

46.(New) A program of machine-readable instructions according to claim 45, wherein the actions further comprise:

for each user, comparing the instantaneous group SNR of each group of sub-carriers with a pre-defined set of switching thresholds to determine bit allocations for the equivalent sub-carrier; and

modulating each equivalent sub-carrier with a corresponding number of data bits, corresponding to the user's group SNR.

47.(New) A program of machine-readable instructions according to claim 45, wherein for each user using the instantaneous group SNR of the user's group of sub-carriers, calculating bit and power allocation for each equivalent sub-carrier and modulating each equivalent sub-carrier with a corresponding number of data bits, corresponding to the user's group SNR.

48.(New) A program of machine-readable instructions according to claim 43, wherein the actions further comprise:

for each user and in each group of sub-carriers, regarding the instantaneous group SNR as the instantaneous SNR of an equivalent single sub-carrier to the group.

49.(New) A program of machine-readable instructions according to claim 46, wherein the actions further comprise:

any groups of sub-carriers having a group SNR below a switching threshold are not modulated;

modulating at least one group of sub-carriers of said G groups, having a first group SNR above said switching threshold, with a first number of data bits according to a first modulation scheme;

modulating at least one group of sub-carriers of said G groups, having a second group SNR next above said first group SNR, with a second number of data bits according to a second modulation scheme; and

the actions not including modulating any groups of sub-carriers having a group SNR below a switching threshold.

50.(New) A program of machine-readable instructions according to claim 46, wherein the actions further include selecting at least one switching threshold between at least two SNRs so as to satisfy a performance criterion of a system.

51.(New) A program of machine-readable instructions according to claim 43, wherein the actions further comprise:

modulating user data bits for each user in each group of modulated sub-carriers by a modulation scheme corresponding to the user's group SNR; and

spreading the modulated user bits with a spreading code associated with that user; and

loading the spread and modulated user bits into the sub-carriers of the user's group.

52.(New) A program of machine-readable instructions according to claim 51, wherein the actions further comprise:

adding chips from all users synchronously across all the sub-carriers in said G groups, on a sub-carrier-by-sub-carrier basis; and

transmitting an OFDM symbol formed by the addition of said chips.